

Status of GM Crops/ Foods in India

Kapil Shah

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Jatan: A Mission for Sajiv Kheti

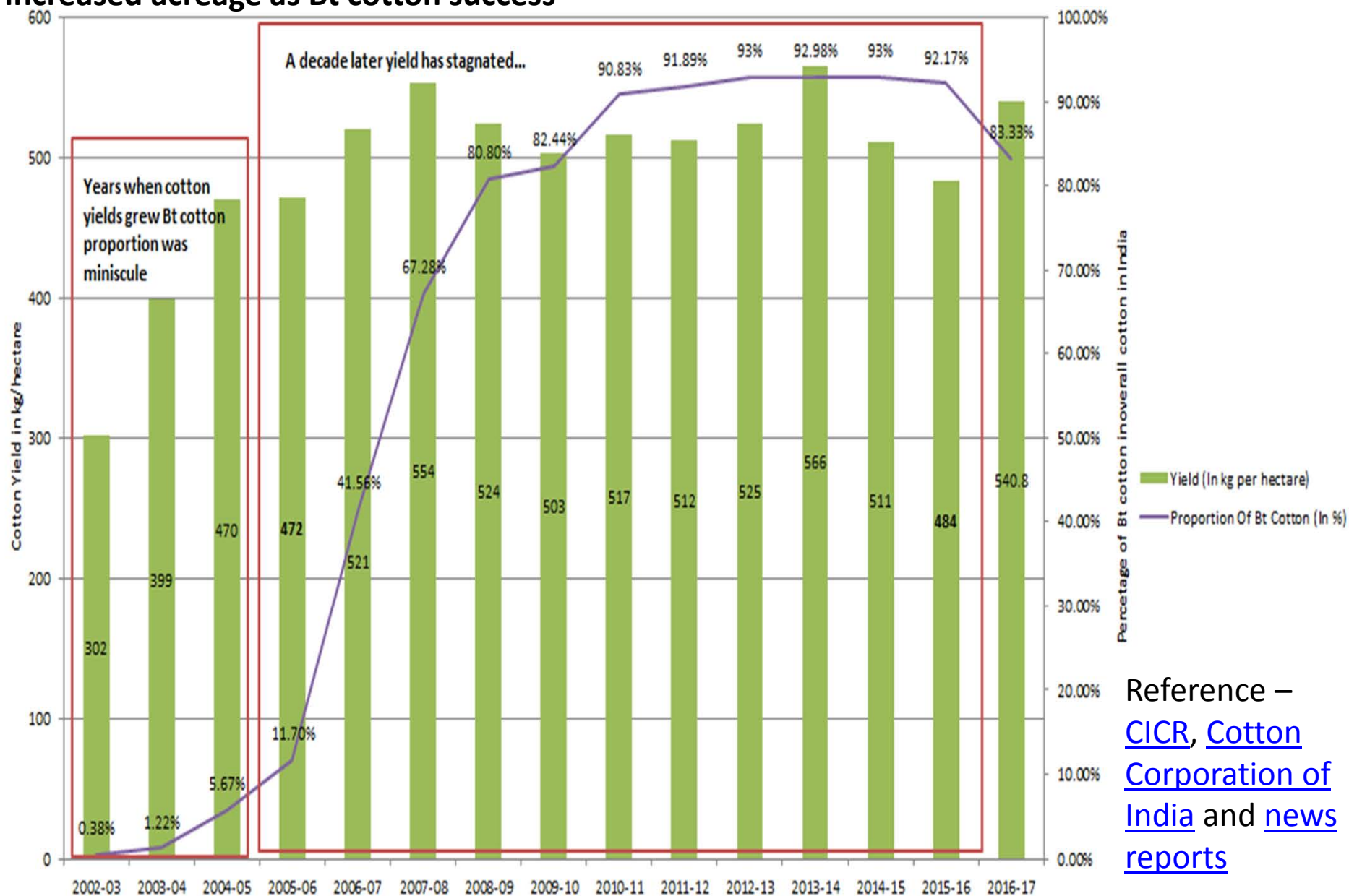
Alliance for Sustainable and Holistic Agriculture (ASHA)

Organic Farming Association of India (OFAI)

Presentation made at Conference on GM-free Regions, Berlin, 7th Sept., 2018

Bt Cotton in India

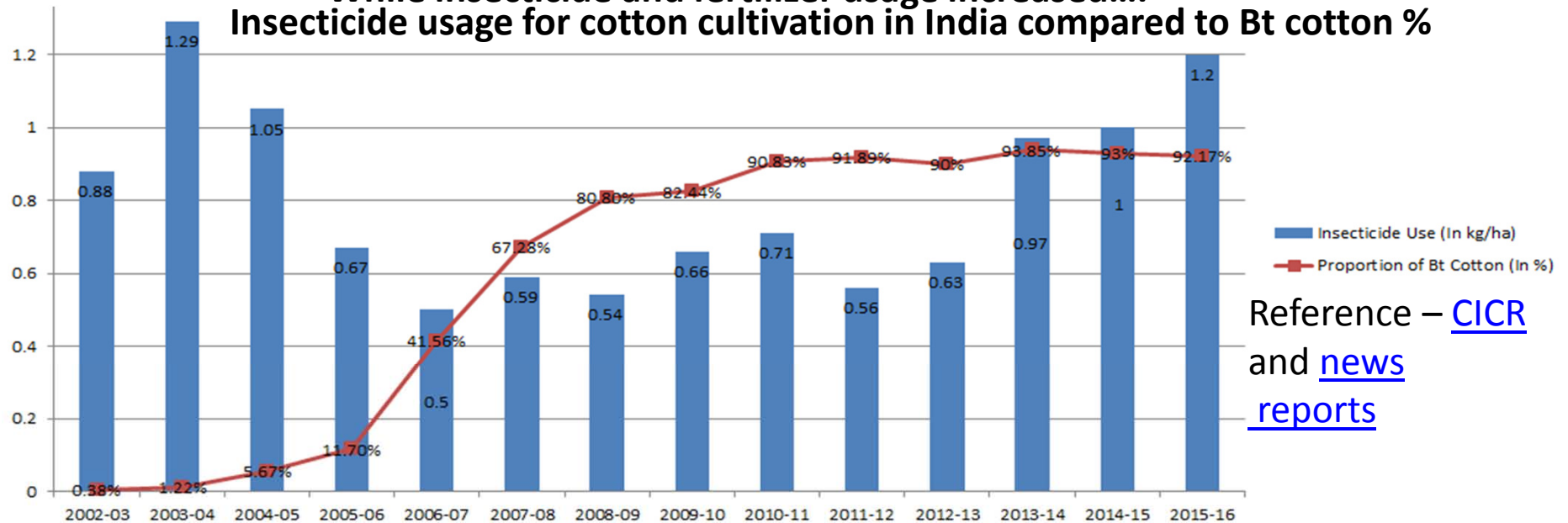
Failure of promise to increase yield...propaganda presents increased production due to increased acreage as Bt cotton success



Reference –
[CICR](#), [Cotton Corporation of India](#) and [news reports](#)

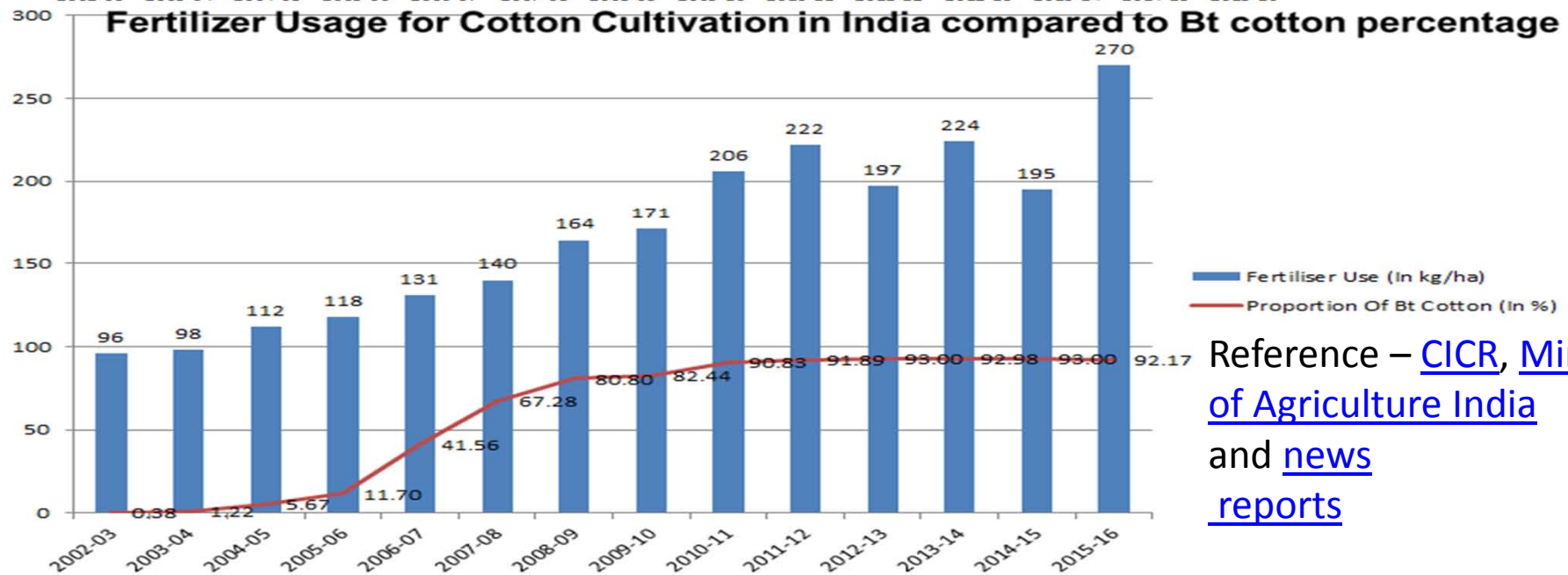
Bt Cotton in India

While insecticide and fertilizer usage increased....
Insecticide usage for cotton cultivation in India compared to Bt cotton %



Reference – [CICR](#)
and [news reports](#)

Fertilizer Usage for Cotton Cultivation in India compared to Bt cotton percentage



Reference – [CICR](#), [Min of Agriculture India](#)
and [news reports](#)

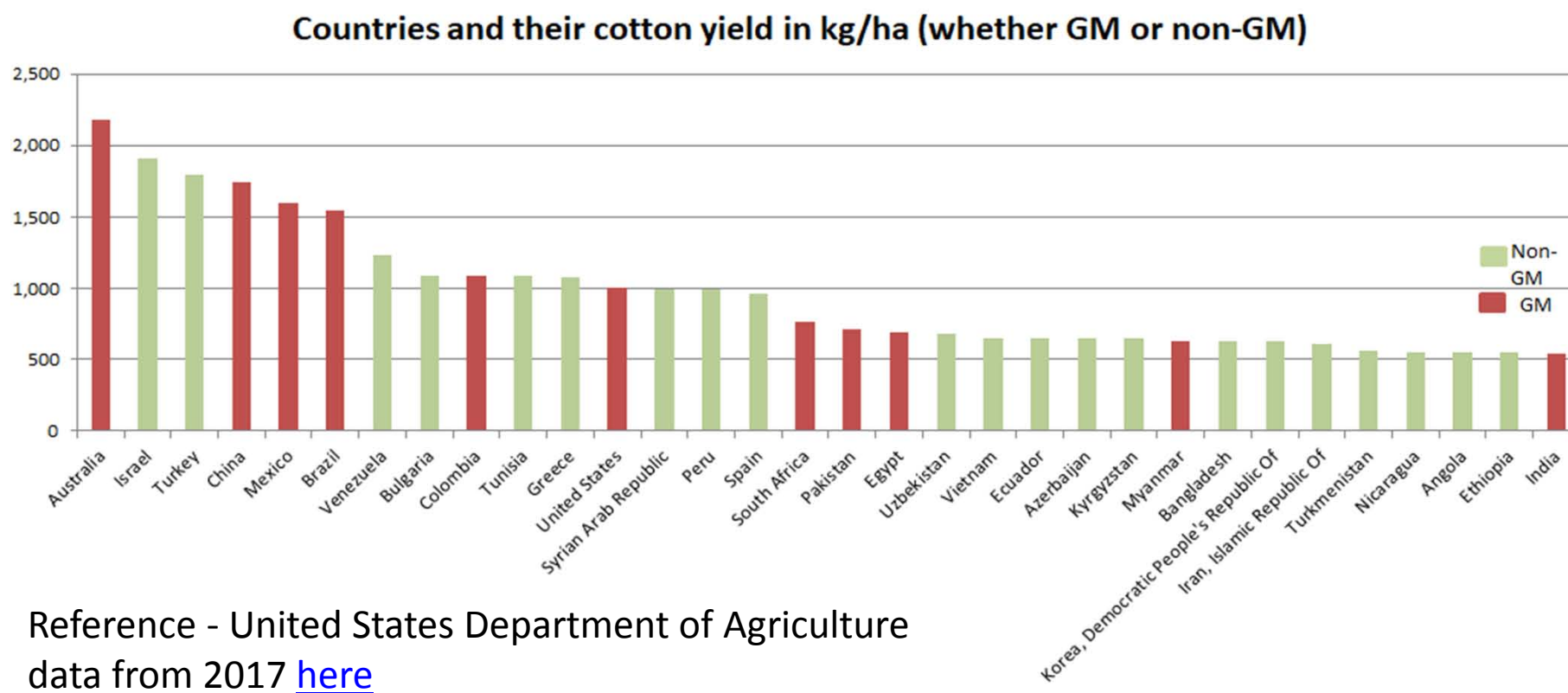
Bt Cotton in India

Cost of cultivation increased more than 300% from 2001 to 2011 from Rs 15,961 per hectare to Rs 71,115 per hectare. Reference - [here](#)

Between 2010-15 the net income for cotton farmers fell drastically with the 2014-15 average net income for a cotton farmer being **negative Rs 6318 per hectare**. Reference - [here](#)

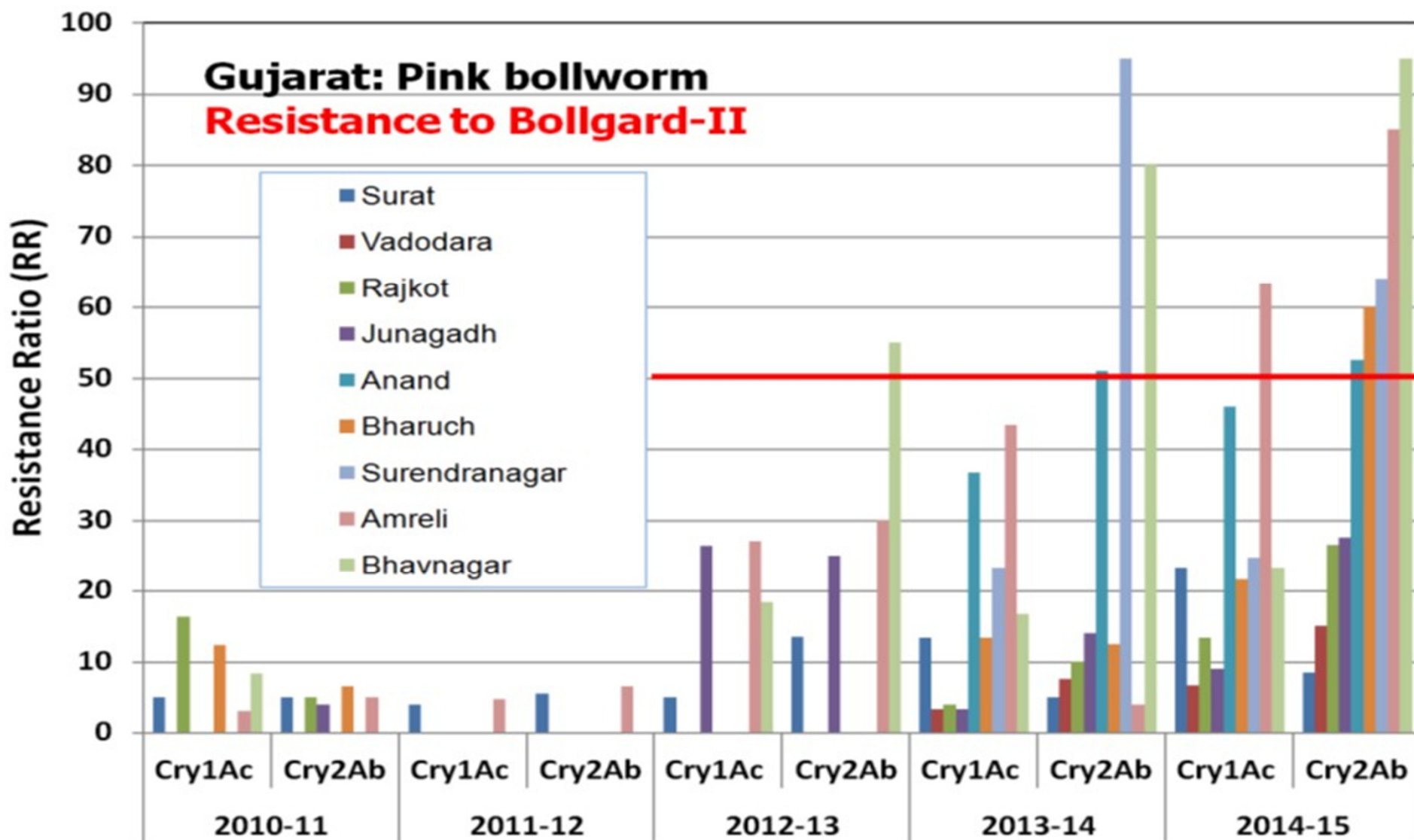
Non-Bt varieties wiped off.

Of 31 countries with higher cotton yield than India's 21 use non GM cotton



Reference - United States Department of Agriculture data from 2017 [here](#)

PINK BOLLWORM DEVELOPS RESISTANCE



Uprooting standing Bt Cotton Crop due to Boll worms



- Video on Cotton Boll Worm

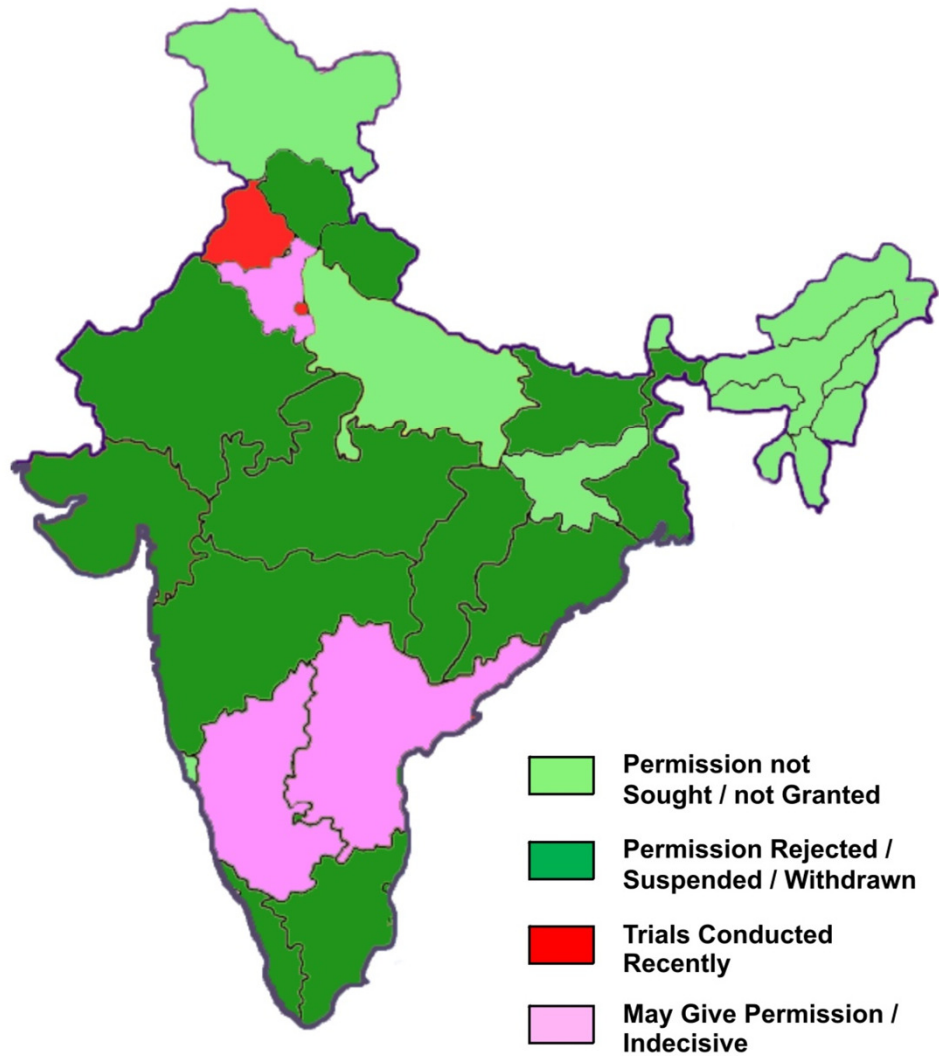
Moratorium on Bt. Brinjal



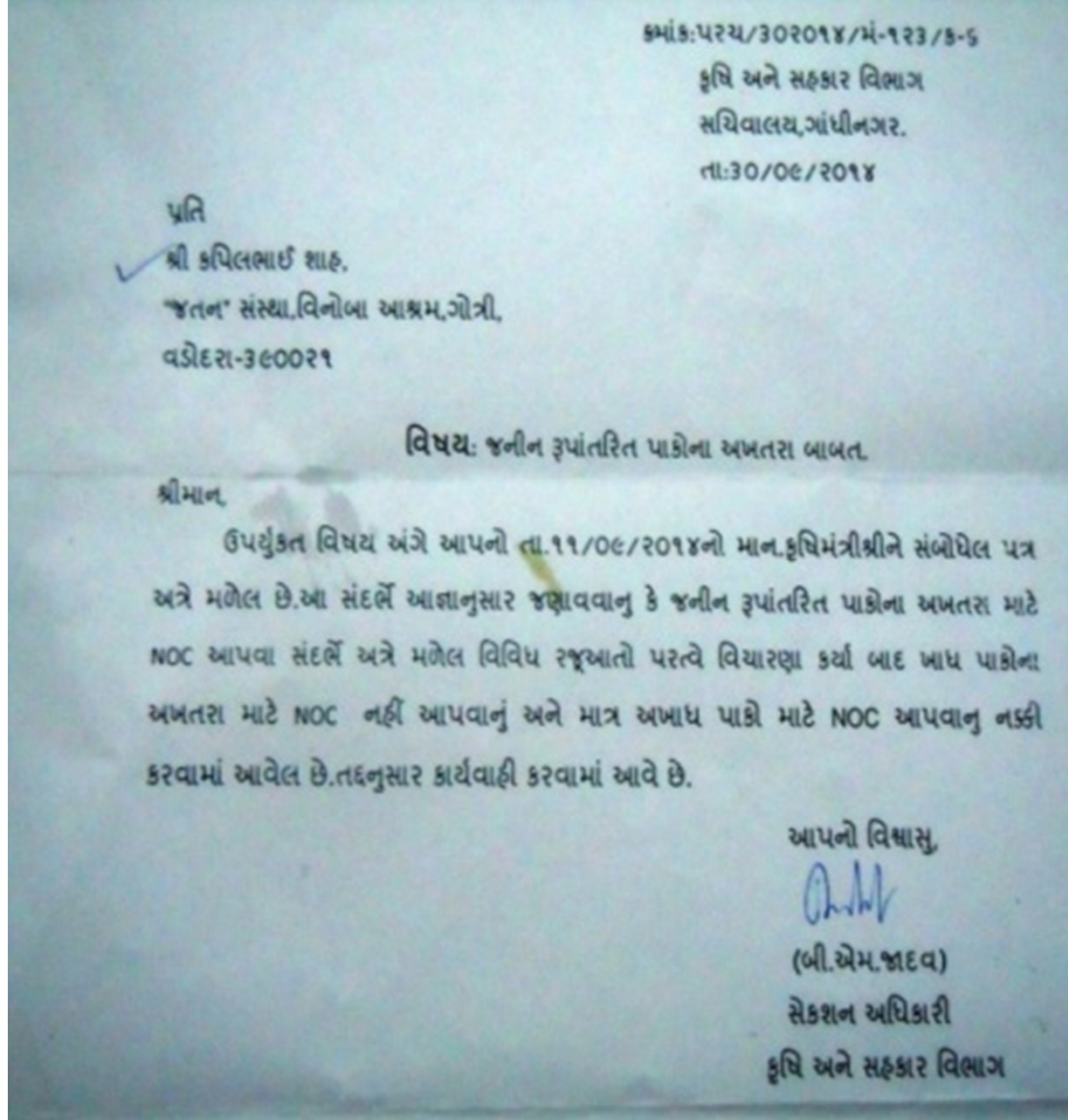
State-wise Present Status of Permission Related to GM food Crop Trials in India

(October- 2015)

States are Denying



Gujarat Bans GM Food Crop Trials



Date:

30/ 09/2014

To,
Shri. Kapilbhai Shah,
JATAN Sansta, Vinoba Ashram, Gotri
Vadodara: 390 021

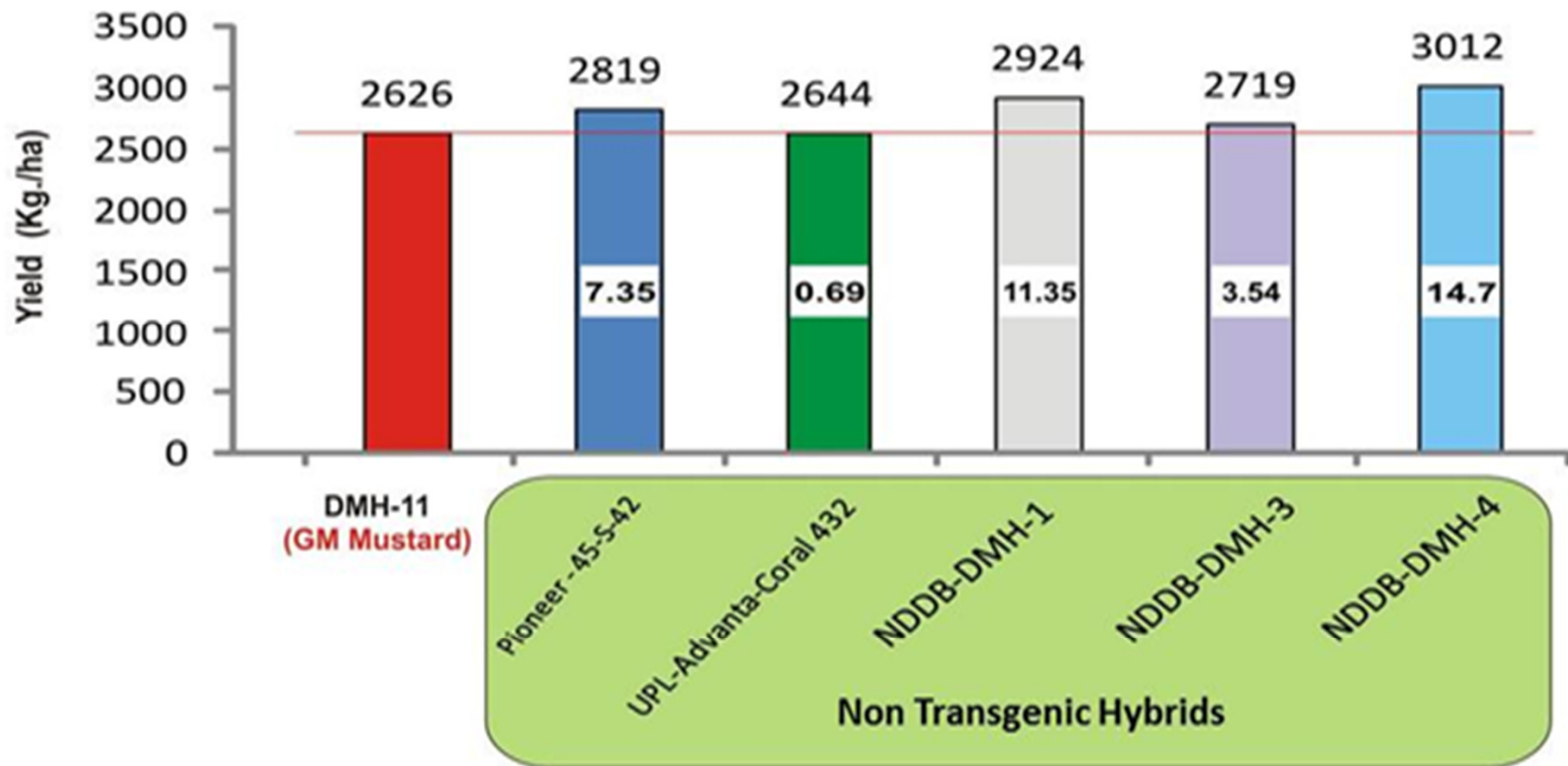
Subject: Regarding Trials of Genetically Modified Crops

This office has received your letter dated 11/09/2014 addressed to Hon. Agricultural Minister regarding the subject mentioned above. In this **reference I am instructed to inform you that after due thinking (consideration) based on the various presentations received by this office, it is decided that NOC will not be given to food crops and NOC to non-food crops only will be given.** Due action is taken accordingly.

Your faithfully,
sd/-
(B. M. Jadav)
Section Officer
Dept. of Agriculture and Cooperation

GM Mustard Yields Less than Current Hybrids

Figures in white box in bars shows % increase over DMH-11



Ref : 1. Data of DMH-11 is the average of 8 trials conducted under Bio-Safety Research Level (BRL) – I & II.

2. Data of Non Transgenic Hybrids are taken from "Heterosis Breeding for Improvement of Indian Mustard" – Presentation made by Dr. Y S Sodhi of Centre for Genetic Manipulation of Crop Plants, University of Delhi South Campus on 20th Feb. 2015 at National Seminar entitled "Strategic Interventions to Enhance Oilseed Production in India" organized by Indian Society of Oilseed Research.

Seed Yield (Kg/ha) with System of Mustard Intensification

State	Organisation/ Institute	Year	No. of farmers	Average Yield
Bihar	PRADAN/PRAN	2009-10	7	2964
		2010-11	273	3211
		2011-12	1636	3458
Madhya Pradesh	Department of Agriculture, GoMP (crop cutting experiments in 8 fields, out of 12 hectares of farmers' fields)	2012-13	8	4693
Rajasthan	DRMR Research	2013-14	-	3560
Non-SMI (for comparison)				
Hybrid	Developer	Year	No. of farmers	Average Yield
DMH-1 (Survey in farmers' fields by UDSC)	UDSC/DU	2009-10	63	2124
GM-DMH-11	UDSC/DU	3 years	-	2626

- http://sri.cals.cornell.edu/aboutsri/othercrops/otherSCI/In_SMImustard_Pradan.pdf
- <https://www.dropbox.com/s/146nyi8lbgn32us/Rajesh%20Tripathi%20-%20Powerpoint%20-%20SRI%20in%20Mustard.pdf?dl=0> :
- "Unprecedented Growth Achieved Using SRI Technique (SRI, SMI & SWI), District Umaria (Madhya Pradesh), Year 2012-13 & 2013-14, Department of Farmer Welfare & Agriculture Development, Government of Madhya Pradesh
- Directorate of Rapeseed-Mustard Research Annual Report 2013-14: http://www.drmr.res.in/publication/DRMR_ar_%202013-14.pdf
- Performance of DMH-1 in farmers' fields during 2009-10 – survey results from 63 farmers. Presentation by Dr Deepak Pental: <http://www.slideshare.net/GCProgramme/keynote-icrisat-pental>

GM mustard: Swapping the parents

Which is REAL DMH-11?

Until 2006-07:

- Offspring of **EH-2** (*barnase*) X **Varuna** (*barstar*)

During BRL:

- Offspring of **Varuna** (*barnase*) X **EH-2** (*barstar*)

Technically this can be considered as reciprocal cross- not exactly.

Critical Objection:

- When the parents are swapped, the offspring is bound to be different in terms of cytoplasmic inheritance
- This also has implications for event selection and stability
- Has this swapping happened with regulatory clearance or ignorance?
- Has separate Event Selection process of applying, being permitted and testing happened?
- Has GEAC discussed this? Did this have any bearing on biosafety testing?
- Is maintenance of A SINGLE biosafety dossier under the name of DMH-11, for two DIFFERENT GMOs acceptable?

Improper Testing of GM Mustard

1. **Though DMH-11 is Herbicide Tolerant** but was never tested as a Herbicide Tolerant crop
- 2 **The Technical Expert Committee (TEC) of Supreme Court has said:** Biosafety studies should be **INDEPENDENT , LONG TERM, INTER GENERATIONAL**. This is not done for any GM crop before clearance
3. **No tests done of the HT crop ALONG WITH herbicide used with it:**
 - herbicides are probable human carcinogens
 - Rapid emergence of “Super-Weeds” results in more herbicide use
 - HT crops lead to greater chemical residues in consumer food.
4. **The “Assessment of Food Safety and Environment Safety” Report** is not a biosafety study but a mere assessment of the main study. ‘The information is scanty’ with no disclosure of dates or details of trials.

False Claims

1. The “25% to 30% Higher Yield” Claim

Comparators were old (1975 & 1982) varieties.

Existing 4 hybrids give higher yields than DMH-11

Non GM System of Mustard Intensification yields far higher (22% to 78% in trials) than DMH-11

2. The “will reduce oil imports” Claim

Mustard (canola) is only 10% of edible oil imports

Tariffs and pricing are main determiners of imports

3. The “Superior technology for Hybrid Creation” Claim

The 5 highest yield countries do not use GM for this

Apex Committees Reports

India's Joint Parliamentary Committee on Agriculture **unanimously found regulatory failures, high risks, poor benefits. Called for moratorium on GM crops & GM Field Trials (2012 unanimous report by 31 MPS across parties)**

Supreme Court appointed Technical Expert Committee in 2013 has called for :

Ban on all Herbicide Tolerant GM Crops

Ban on crops where India is Centre of Origin

Long term lab studies and no release till full safety

(Over 250 Scientists have endorsed the TEC report)

Parliamentary Standing Committee on Biotechnology (2017) also concluded that
“The Committee strongly believes that unless the bio-safety and socio-economic desirability, taking into consideration long run effects, is evaluated by a participatory, independent and transparent process and a retrieval and accountability regime is put in place, no GM crop should be introduced in the country. ”

Failure to regulate crops :

Bt cotton

- Introduced/cultivated illegally initially (from field trials), given approval in 2002
- Being sold for human consumption
- Cows fed Bt cottonseed feed found to have reduced milk yield from promoter's own data as revealed by Supreme Court Technical Expert Committee (Reference – [here](#))
- Difference in organ size for animals fed Bt cotton for lung, spleen, heart, and uterus compared to non-Bt cotton in same report.
- All of these findings from promoter data which were presented to GEAC, however approved!

Failure to regulate crops:

HT Cotton

- First complaints made on its cultivation in 2009
- Action to restrict it finally taken in 2017 (Source [here](#))

HT Soybean

- Found to be cultivated illegally in Gujarat in 2017
- State government swung into action immediately and lodged police complaint against farmers and two seed sellers. (Source [here](#))

High-level committee blows the lid off illegal cotton seed business

The FISEC panel collected 13,361 leaf and seed samples and found 15% prevalence of unapproved HT cotton in major states like Andhra Pradesh, Telangana, Maharashtra and Gujarat

Last Published: Tue, Jul 10 2018. 11 53 PM IST



“6.75 million illegal seed packets or close to 9 Billion Rs business in illegal seeds,” said a biotechnology expert who did not want to be named.

Illegal Cultivation of Soyabean

Sample Type : SOYABEAN SEED
Received : 26/10/2017
Completed : 1/11/2017
Sample Condition : UNSEALED & SATISFACTORY
Sample Qty. : 10 GM
Section Code : GMO
Sample Mark : Bharatiya Kisan Sangh

Test Start/End Date : 26/10/2017 - 01/11/2017

State of Detection	Result	Method
Detection of GMO event Specific Sequence Roundupready soya (RRS)	Detected	SOP/SGSIN/AMD/AGR/GMO EVENT
Detection of GM Specific Sequence 35s Promoter Sequence	Detected	ISO : 21569 : 2005 (Amd:1 - 2013)
NoS Terminator sequence	Detected	ISO : 21569 : 2005 (Amd:1 - 2013)
Plant Chloro Plast Sequence	Detected	ISO : 21569 : 2005 (Amd:1 - 2013)
Genetically Modified Organism (GMO)	Positive	ISO : 21569 : 2005 (Amd:1 - 2013)
Cp4epsps	Detected	ISO : 21569 : 2005 (Amd:1 - 2013)

***End o

Failure to regulate imports:

- GM seeds, oil and packaged food products being imported
- No action taken after multiple complaints (See [here](#) and [here](#))
- Violation of numerous laws and failure of multiple regulatory bodies
 - Ministry of Commerce ;
 - Ministry of Environment, Forest & Climate Change ;
 - Ministry of Health and Family Welfare ;
 - Ministry of Consumer Affairs, Food and Public Distribution) and violation of numerous laws

Failure to regulate imports:

- Seeds/ Grains being imported from countries which grow GM varieties of these crops, for instance
 - Soy >1700 tonnes from US over last decade (which grows more than 90% GM soy)
 - Corn - from US – 20 tonnes, Argentina >500 tonnes (which grow more than 90% GM corn), Brazil (88% GM corn) and Spain (35% GM corn) – 390 kgs
 - Beet Sugar - from US (which grows more than 90% GM beet sugar) ; 149 tonnes
 - Other imports include canola, squash, papaya, apple, potato and tobacco from GM producing countries

References – Zaubia [website](#), Ministry of Commerce [website](#)

India is consuming banned GM food owing to lack of regulations

Genetically modified food items are flooding Indian markets with seemingly no trouble at all

Overall 32% (21/65) food product samples tested positive

Oils: 56% (9/16)

Packaged Food: 25% (10/39)

Infant Food: 25% (2/8)

Present R and D using CRISPR in India



[Functional & Integrative Genomics](#)

January 2018, Volume 18, [Issue 1](#), pp 89–99 | [Cite as](#)

CRISPR/Cas9-mediated efficient editing in *phytoene desaturase* (*PDS*) demonstrates precise manipulation in banana cv. Rasthali genome

[Authors](#)

[Authors and affiliations](#)

Navneet Kaur, Anshu Alok, Shivani, Navjot Kaur, Pankaj Pandey, Praveen Awasthi, Siddharth Tiwari 

Animals: Myostatin knockout chicken, Mice

Crops: Banana , Rice, Wheat, Mustard, Potato, Tobacco

Regulators are Ignorant

File No. C-12019/1/2018-CS-III
Government of India
Ministry of Environment, Forest and Climate Change
CS-III (Biosafety) Division



Indira Paryavaran Bhavan
Jorbagh, Aliganj
New Delhi-110003
Date: 14.05.2018

Subject: Information under Right to Information (RTI) Act, 2005 by Ms. Kavitha K
(MOENF/R/2018/50389 dated 13.04.2018)-reg.

Dear Madam,

This has reference to your RTI Registration No **MOENF/R/2018/50389** dated 13.04.2018 seeking information on above application.

2. Information in respect of questions is given below:

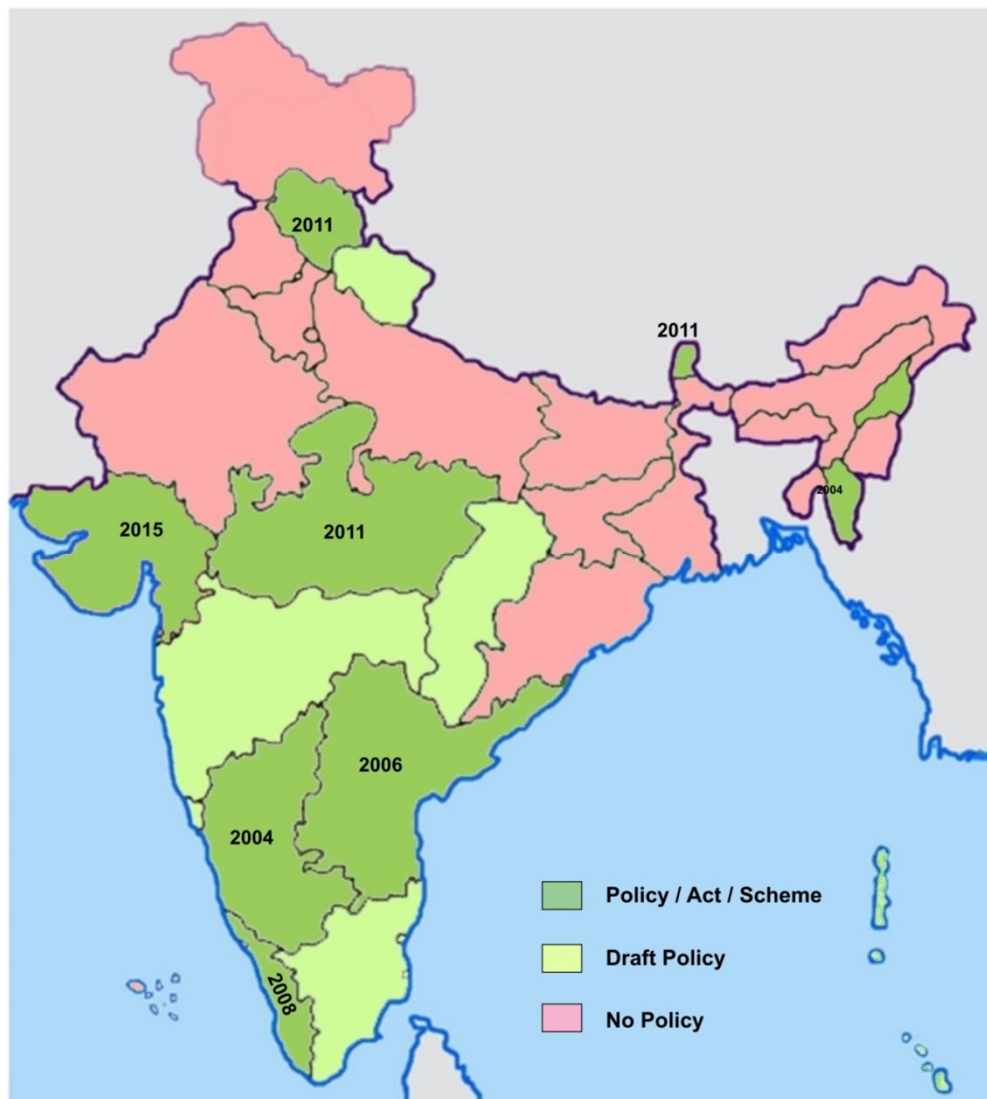
As of now GEAC has not received any applications seeking permission for trials/ release with CRISPR Cas9 technology and hence no information/ comments to provide.

Regulating CRISPER in India

- A TASK FORCE HAS BEEN ESTABLISHED IN 2014

"with a vision to foster innovation and promote development of Genome-wide Analysis and Engineering Technologies to make them accessible and affordable for wider use in Life Sciences. Initially, the Task Force's purpose is to help establish accessible facilities on some emerging technologies" LIKE "Genome Manipulation, Editing and Interference by CRISPER, TALENS and RNAi, Nucleic Acid Chips for genetic variations and chromatin remodelling, Single Cell Genomics and Mass-Cytometry"

Status of Existence of Organic Farming Policy 2015



**9 states have
Declared Policy**

**5 states have
Draft Policy**

Each State
should have
Organic Farming
Policy

Organic Farming and GM crops can not Co-exist in India

Long way to go

